

### FEATURES

- Efficiency up to 86%
- 1500 VDC Isolation
- 4:1 Wide Input Range
- Remote On/Off Control
- UL 1950 and EN 55022 Approved
- >700,000 Hours MTBF

### DESCRIPTIONS

The 1500UFR series is a family of 16 models DC/DC converters designed to address the application needs for data communication equipment, mobile battery driven equipment, distributed power systems, telecommunications equipment, mixed analog/ digital subsystems, process/machine control equipment, computer peripheral systems and industrial robot systems. In addition to packing up to 15 watts of power into a 2" X 1" X 0.4" package with efficiency up to 86%, the series also has ultra-wide input ranges of 9-36VDC and 18-75 VDC, which are available in output voltage of 3.3V, 5V, 5.1V, 12V, 15V,  $\pm 5V$ ,  $\pm 12V$  and  $\pm 15V$  VDC.

### OUTPUT CHARACTERISTICS

|                              | Min        | Typ        | Max | Unit/Comments                                                      |
|------------------------------|------------|------------|-----|--------------------------------------------------------------------|
| Output Voltage Set Point     | $\pm 1.0$  | $\pm 2.0$  |     | % Output voltage at nominal line & FL                              |
| Output Voltage Balance       | $\pm 0.5$  | $\pm 2.0$  |     | %; Equal Output Loads                                              |
| Line Regulation              | $\pm 0.1$  | $\pm 0.5$  |     | % Output voltage measured from min. input line to maximum          |
| Load Regulation              | $\pm 0.5$  | $\pm 1.0$  |     | % Output voltage measured from FL to 10% load                      |
| Ripple/Noise                 |            | 55         | 80  | mV p-p, Nom.Line @FL, 20MHz B.W., using 1 $\mu$ F bypass capacitor |
| Over Power Protection        | 120        |            |     | %                                                                  |
| Transient Response Deviation | $\pm 2$    | $\pm 4$    |     | % deviation of Vout for a 25% load change                          |
| Transient Recovery Time      | 300        | 500        |     | $\mu$ S for 25% load change, to within 1%                          |
| Temperature Coefficient      | $\pm 0.01$ | $\pm 0.02$ |     | % per °C                                                           |
| Output Short Circuit         |            |            |     | Continuous                                                         |

### INPUT CHARACTERISTICS

|                           | Min | Typ  | Max  | Unit/Comments      |
|---------------------------|-----|------|------|--------------------|
| Start Voltage             |     |      |      |                    |
| 24 VDC Input Models       | 8   | 8.5  | 9    | VDC                |
| 48 VDC Input Models       | 15  | 17   | 18   | VDC                |
| Input Fuse Requirement    |     |      |      |                    |
| 24 VDC Input Models       |     | 2500 |      | mA; Slow blow type |
| 48 VDC Input Models       |     | 1250 |      | mA; Slow blow type |
| Under Voltage Shutdown    |     |      |      |                    |
| 24 VDC Input Models       | 7   | 8    | 8.5  | VDC                |
| 48 VDC Input Models       | 13  | 15   | 17   | VDC                |
| Reverse Polarity Input    |     |      | 1    | Amp                |
| Short Circuit Input Power |     |      | 3500 | mW                 |
| Input Filter              |     |      |      | Pi Filter          |

### GENERAL CHARACTERISTICS

|                       | Min  | Typ  | Max  | Unit/Comments                       |
|-----------------------|------|------|------|-------------------------------------|
| Switching Frequency   | 290  | 330  | 400  | kHz                                 |
| Isolation Voltage     | 1500 |      |      | VDC, 1 minute                       |
| Isolation Resistance  | 1000 |      |      | Mohm, 500VDC                        |
| Isolation Capacitance |      | 1200 | 1500 | pF, 100kHz, 1Volt                   |
| MTBF (MIL-HBK-217F)   | 0.7  |      |      | Million Hours, +25°C, Ground Benign |

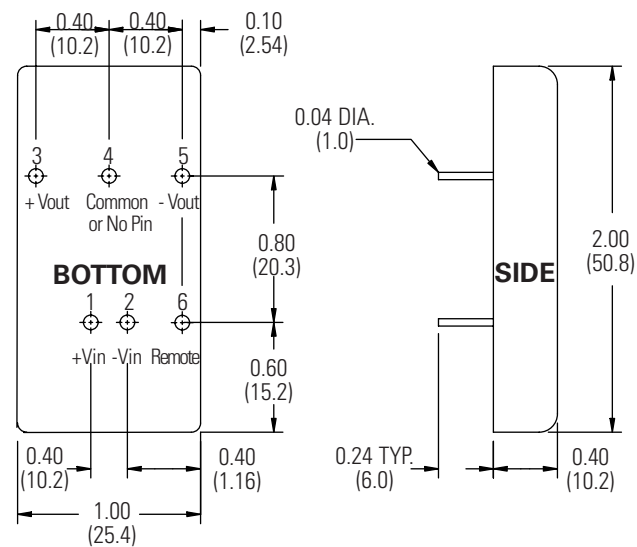
ENVIRONMENTAL SPECIFICATIONS

|                       | Min | Typ | Max  | Unit/Comments              |
|-----------------------|-----|-----|------|----------------------------|
| Operating Temp. Range | -40 |     | +60  | °C; Ambient                |
| Operating Temp. Range | -40 |     | +100 | °C; Case                   |
| Storage Temp. Range   | -50 |     | +125 | °C                         |
| Relative Humidity     |     |     | 95   | % Humidity; non-condensing |
| Cooling               |     |     |      | Free-Air Convection        |

PHYSICAL CHARACTERISTICS

|               | Unit/Comments                                      |
|---------------|----------------------------------------------------|
| Case Size     | 1.0 X 2.0 X 0.40 inches<br>(25.4 X 50.8 X 10.2 mm) |
| Case Material | Metal with Non-Conductive Baseplate                |
| Flammability  | UL94V-0                                            |
| Weight        | 32 Grams                                           |

OUTLINE DRAWING



PIN OUT CHART

| Pins | Single                   | Dual   |
|------|--------------------------|--------|
| 1    | + Vin                    | + Vin  |
| 2    | - Vin                    | - Vin  |
| 3    | + Vout                   | + Vout |
| 4    | No pin                   | Common |
| 5    | - Vout                   | - Vout |
| * 6  | Remote On/Off (Optional) |        |

Notes:

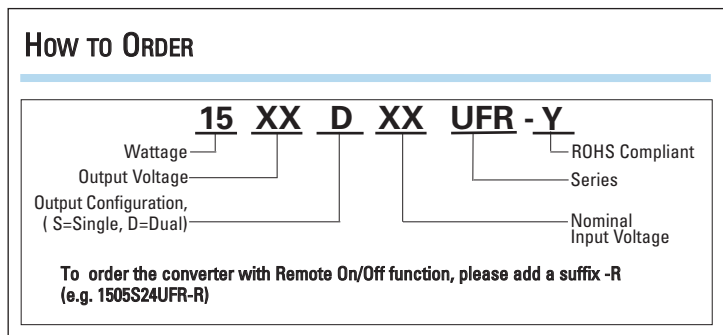
1. Unless otherwise specified dimensions are in inches (mm).

|            |                |              |
|------------|----------------|--------------|
| Tolerances | Inches         | mm           |
|            | X.XX = ±0.02   | X.X = ±0.5   |
|            | X.XXX = ±0.010 | X.XX = ±0.25 |

\* 2. Remote On/Off is optional. Use -R suffix.

All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified.  
External, low ESR, 10 microfarad (minimum) capacitor across output is recommended for operation.

## How To ORDER



## MODEL SELECTION CHART

| Model       | Nominal Input Voltage (VDC) | Input Voltage Range (VDC) | Output Voltage (VDC) | Max. Output Current (mA) | Max. Output Current (mA) | No Load Input Current (mA) | Full Load Input Current (mA) | Reflected Ripple Current (mA) | Efficiency @ FL (%) |
|-------------|-----------------------------|---------------------------|----------------------|--------------------------|--------------------------|----------------------------|------------------------------|-------------------------------|---------------------|
| 15033S24UFR | 24                          | 9 - 36                    | 3.3                  | 3000                     | 300                      | 25                         | 528                          | 40                            | 78                  |
| 1505S24UFR  | 24                          | 9 - 36                    | 5                    | 3000                     | 300                      | 25                         | 762                          | 40                            | 82                  |
| 1512S24UFR  | 24                          | 9 - 36                    | 12                   | 1250                     | 125                      | 25                         | 735                          | 40                            | 85                  |
| 1515S24UFR  | 24                          | 9 - 36                    | 15                   | 1000                     | 100                      | 25                         | 726                          | 40                            | 86                  |
| 1505D24UFR  | 24                          | 9 - 36                    | ±5                   | ±1500                    | ±150                     | 25                         | 771                          | 40                            | 81                  |
| 1512D24UFR  | 24                          | 9 - 36                    | ±12                  | ±625                     | ±62.5                    | 25                         | 735                          | 40                            | 85                  |
| 1515D24UFR  | 24                          | 9 - 36                    | ±15                  | ±500                     | ±50                      | 25                         | 726                          | 40                            | 86                  |
| 15051S24UFR | 24                          | 9 - 36                    | 5.1                  | 3000                     | 300                      | 25                         | 787                          | 40                            | 81                  |
| 15033S48UFR | 48                          | 18 - 75                   | 3.3                  | 3000                     | 300                      | 15                         | 264                          | 30                            | 78                  |
| 1505S48UFR  | 48                          | 18 - 75                   | 5                    | 3000                     | 300                      | 15                         | 381                          | 30                            | 82                  |
| 1512S48UFR  | 48                          | 18 - 75                   | 12                   | 1250                     | 125                      | 15                         | 368                          | 30                            | 85                  |
| 1515S48UFR  | 48                          | 18 - 75                   | 15                   | 1000                     | 100                      | 15                         | 363                          | 30                            | 86                  |
| 1505D48UFR  | 48                          | 18 - 75                   | ±5                   | ±1500                    | ±150                     | 15                         | 386                          | 30                            | 81                  |
| 1512D48UFR  | 48                          | 18 - 75                   | ±12                  | ±625                     | ±62.5                    | 15                         | 368                          | 30                            | 85                  |
| 1515D48UFR  | 48                          | 18 - 75                   | ±15                  | ±500                     | ±50                      | 15                         | 369                          | 30                            | 86                  |
| 15051S48UFR | 48                          | 18 - 75                   | 5.1                  | 3000                     | 300                      | 15                         | 393                          | 30                            | 81                  |

## DERATING CURVES

1500UFR - All Models

